



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Se-Chang KWON, et al.
Serial No.: 10/031,123
Filed: January 9, 2002
For: MODIFIED HUMAN GRANULOCYTE-COLONY STIMULATING
FACTOR AND PROCESS FOR PRODUCING SAME

ATTENTION: APPLICATION BRANCH

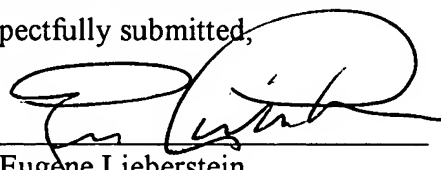
Asst. Commissioner for Patents
Initial Patent Examination Division
Washington, D.C. 20231

**STATEMENT REGARDING SUBMISSION OF SEQUENCE LISTING IN
ACCORDANCE WITH PCT RULE 13TER.2 AND 35 U.S.C. 1.821-1.825**

Sir:

The contents of the sequence listing information recorded in computer readable format is identical to the written sequence listing provided herewith and contains no new matter.

Respectfully submitted,

By: 
Eugene Lieberstein
Registration No. 24,645

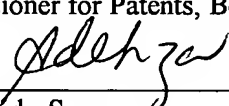
September 4, 2002

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CERTIFICATE OF MAILING

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Audrey de Souza



Sequence Listing

<110> Se-Chang KWON
Sung-Youb JUNG
Sung-Min BAE
Gwan-Sun LEE

<120> Modified human granulocyte-colony stimulating factor and process
for producing same

<130> PCA00729/HMY

<140> US/10/031,123

<141> 2002-01-09

<160> 71

<170> KOPATIN 1.0

<210> 1

<211> 522

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (1)..(522)

<400> 1

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tgc	tta	gag	caa	gtg	agg	aag	atc	cag	ggc	gat	ggc	gca	gcg	ctc	cag	96
Cys	Leu	Glu	Gln	Val	Arg	Lys	Ile	Gln	Gly	Asp	Gly	Ala	Ala	Leu	Gln	
			20					25					30			

gag	aag	ctg	tgt	gcc	acc	tac	aag	ctg	tgc	cac	ccc	gag	gag	ctg	gtg	144
Glu	Lys	Leu	Cys	Ala	Thr	Tyr	Lys	Leu	Cys	His	Pro	Glu	Glu	Leu	Val	
		35					40					45				

ctg	ctc	gga	cac	tct	ctg	ggc	atc	ccc	tgg	gct	ccc	ctg	agc	tcc	tgc	192
Leu	Leu	Gly	His	Ser	Leu	Gly	Ile	Pro	Trp	Ala	Pro	Leu	Ser	Ser	Cys	
	50					55					60					

ccc	agc	cag	gcc	ctg	cag	ctg	gca	ggc	tgc	ttg	agc	caa	ctc	cat	agc	240
Pro	Ser	Gln	Ala	Leu	Gln	Leu	Ala	Gly	Cys	Leu	Ser	Gln	Leu	His	Ser	
65					70				75					80		

ggc	ctt	ttc	ctc	tac	cag	ggg	ctc	ctg	cag	gcc	ctg	gaa	ggg	ata	tcc	288
Gly	Leu	Phe	Leu	Tyr	Gln	Gly	Leu	Leu	Gln	Ala	Leu	Glu	Gly	Ile	Ser	
				85					90					95		

ccc	gag	ttg	ggt	ccc	acc	ttg	gac	aca	ctg	cag	ctg	gac	gtc	gcc	gac	336
Pro	Glu	Leu	Gly	Pro	Thr	Leu	Asp	Thr	Leu	Gln	Leu	Asp	Val	Ala	Asp	
			100					105					110			

ttt	gcc	acc	acc	atc	tgg	cag	cag	atg	gaa	gaa	ctg	gga	atg	gcc	cct	384
Phe	Ala	Thr	Thr	Ile	Trp	Gln	Gln	Met	Glu	Glu	Leu	Gly	Met	Ala	Pro	
		115					120					125				

gcc ctg cag ccc acc cag ggt gcc atg ccg gcc ttc gcc tct gct ttc 432
 Ala Leu Gln Pro Thr Gln Gly Ala Met Pro Ala Phe Ala Ser Ala Phe
 130 135 140

cag cgc cgg gca gga ggg gtc ctg gtt gct agc cat ctg cag agc ttc 480
 Gln Arg Arg Ala Gly Gly Val Leu Val Ala Ser His Leu Gln Ser Phe
 145 150 155 160

ctg gag gtg tcg tac cgc gtt cta cgc cac ctt gcg cag ccc 522
 Leu Glu Val Ser Tyr Arg Val Leu Arg His Leu Ala Gln Pro
 165 170

<210> 2
 <211> 174
 <212> PRT
 <213> Homo sapiens

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 1 5 10 15
 Cys Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
 20 25 30
 Glu Lys Leu Cys Ala Thr Tyr Lys Leu Cys His Pro Glu Glu Leu Val
 35 40 45
 Leu Leu Gly His Ser Leu Gly Ile Pro Trp Ala Pro Leu Ser Ser Cys
 50 55 60
 Pro Ser Gln Ala Leu Gln Leu Ala Gly Cys Leu Ser Gln Leu His Ser
 65 70 75 80
 Gly Leu Phe Leu Tyr Gln Gly Leu Leu Gln Ala Leu Glu Gly Ile Ser
 85 90 95
 Pro Glu Leu Gly Pro Thr Leu Asp Thr Leu Gln Leu Asp Val Ala Asp
 100 105 110
 Phe Ala Thr Thr Ile Trp Gln Gln Met Glu Glu Leu Gly Met Ala Pro
 115 120 125
 Ala Leu Gln Pro Thr Gln Gly Ala Met Pro Ala Phe Ala Ser Ala Phe
 130 135 140
 Gln Arg Arg Ala Gly Gly Val Leu Val Ala Ser His Leu Gln Ser Phe
 145 150 155 160
 Leu Glu Val Ser Tyr Arg Val Leu Arg His Leu Ala Gln Pro
 165 170

<210> 3
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer for the N-terminal of hG-CSF

<400> 3
 cgccgccata tgacacccct gggccctgcc ag 32

<210> 4
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer for the C-terminal of hG-CSF

<400> 4
 accgaattcg gatactcagg gctgcgcaag gtggcg 36

<210> 5
 <211> 72
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide for preparing E. coli enterotoxin II signal peptide

<400> 5
 tcatgaaaaa gaatatcgca tttcttcttg catctatggt cgttttttct attgctacaa 60
 atgcctacgc gt 72

<210> 6
 <211> 72
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide for preparing E. coli enterotoxin II signal peptide

<400> 6
 acgcgtaggc atttgtagca atagaaaaaa cgaacataga tgcaagaaga aatgcgatat 60
 tctttttcat ga 72

<210> 7
 <211> 39
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide primer coding for the N-terminal of [Ser1]hG-CSF

<400> 7
 acaaatgcct acgcgtctcc cctgggccct gccagctcc 39

<210> 8
 <211> 42
 <212> DNA

<213> Artificial Sequence
 <220>
 <223> Oligonucleotide primer coding for the C-terminal of [Ser1]hG-CSF
 <400> 8
 accgaattcg gatactcagg gctgcgcaag gtggcgtaga ac 42

 <210> 9
 <211> 65
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> Oligonucleotide primer coding for E.coli enterotoxin II Shine-Dalgarno sequence
 <400> 9
 cggtttccct ctgagggttg aggtgtttta tgaaaaagaa tatcgcatTT cttcttgcat 60
 ctatg 65

 <210> 10
 <211> 45
 <212> DNA
 <213> Artificial Sequence
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 <223> Oligonucleotide containing BamHI restriction site
 <400> 10
 accgaattcg gatactcagg gctgcgcaag gtggcgtaga acgcg 45

 <210> 11
 <211> 10
 <212> PRT
 <213> Artificial Sequence
 <220>
 <223> Last five amino acids of E. coli enterotoxin II signal peptide plus the 1st to the 5th amino acids of hG-CSF
 <400> 11
 Thr Asn Ala Tyr Ala Thr Pro Leu Gly Pro
 1 5 10

 <210> 12
 <211> 30
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> Oligonucleotide for preparing [Thr1]hG-CSF
 <400> 12
 acaaatgcct acgcgacacc cctgggcct 30

<210> 13
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID NO: 12

<400> 13
agggccccagg ggtgtcgcgt aggcatttgt 30

<210> 14
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> N-terminal sequence of E. coli enterotoxin II signal peptide
having threonine as the 4th amino acid

<400> 14
Met Lys Lys Thr Ile Ala Phe Leu
1 5

<210> 15
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide for substituting the 4th amino acid of E. coli
enterotoxin II signal peptide with threonine

<400> 15
ggtgttttat gaaaaagaca atcgatttc ttc 33

<210> 16
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID No: 15

<400> 16
gaagaaatgc gattgtcttt ttcataaaac acc 33

<210> 17
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> C-terminal sequence of E. coli enterotoxin II signal peptide
having glutamine as the 22nd amino acid

<400> 17
Asn Ala Gln Ala Thr Pro Leu Gly
1 5

<210> 18
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide for substituting the 22nd amino acid of E. coli enterotoxin II signal peptide with glutamine

<400> 18
caaatgccca agcgacaccc ctgggc 26

<210> 19
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID NO: 18

<400> 19
gcccaggggt gtcgcttggg catttg 26

<210> 20
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide for modifying E. coli enterotoxin II Shine-Dalgarno sequence

<400> 20
tctagaggtt gaggtgtttt atga 24

<210> 21
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID NO: 20

<400> 21
tcataaaaca cctcaacctc taga 24

<210> 22
<211> 66
<212> DNA
<213> Artificial Sequence

<220>

<223> S1 oligomer having E. coli-preferred nucleotide sequence coding for the 6th to 26th amino acids of [Ser17]hG-CSF

<400> 22
cagcctcttc tcttcacaa tctttccttc ttaagtctct tgaacaagtt agaaagatcc 60
aaggcg 66

<210> 23
<211> 66
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID NO: 22 (AS1 oligomer)

<400> 23
ccgggtcgga gaagagaagg tgtagaaaag gaagaattca gagaacttgt tcaatctttc 60
taggtt 66

<210> 24
<211> 21
<212> PRT
<213> Escherichia coli

<220>
<221> SIGNAL
<222> (1).. (21)
<223> E. coli OmpA signal peptide

<400> 24
Met Lys Lys Thr Ala Ile Ala Ile Ala Val Ala Leu Ala Gly Phe Ala
1 5 10 15
Thr Val Ala Gln Ala
20

<210> 25
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide containing Hind III recognition site

<400> 25
gttgcgcaag cttctcga 18

<210> 26
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID NO: 25

<400> 26
 tcgagaagct tgcgcaac 18

<210> 27
 <211> 39
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide for the N-terminal of [Ser1] hG-CSF

<400> 27
 gttgcgcaag cttctcccct gggccctgcc agctccctg 39

<210> 28
 <211> 39
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide containing EcoRI restriction site

<400> 28
 accgaattct cagggtgctgcg caaggtggcg tagaacgcg 39

<210> 29
 <211> 13
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> E. coli OmpA signal peptide plus the 1st to the 5th amino acids
 of [Ser1]hG-CSF

<400> 29
 Gly Phe Ala Thr Val Ala Gln Ala Ser Pro Leu Gly Pro
 1 5 10

<210> 30
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide for preparing [Thr1]hG-CSF

<400> 30
 accgttgctgc aagctacacc cctgggcctt 30

<210> 31
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense of SEQ ID NO: 30

<400> 31
agggccccagg ggtgtagctt gcgcaacggt 30

<210> 32
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide for preparing [Ser17]hG-CSF

<400> 32
agcttcctgc tcaagtcttt agagcaagtg agg 33

<210> 33
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID NO: 32

<400> 33
cctcacttgc tctaaagact tgagcaggaa gct 33

<210> 34
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide for preparing [Thr17]hG-CSF

<400> 34
agcttcctgc tcaagacctt agagcaagtg agg 33

<210> 35
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID NO: 34

<400> 35
cctcacttgc tctaaggctt tgagcaggaa gct 33

<210> 36
<211> 33
<212> DNA
<213> Artificial Sequence

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<223> Oligonucleotide for preparing [Ala17]hG-CSF

<400> 36
agcttcctgc tcaaggcctt agagcaagtg agg 33

<210> 37
<211> 33
<212> DNA
<213> Artificial Sequence

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<223> Antisense of SEQ ID NO: 36

<400> 37
cctcacttgc tctaaggcct tgagcaggaa gct 33

<210> 38
<211> 33
<212> DNA
<213> Artificial Sequence

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<223> Oligonucleotide for preparing [Gly17]hG-CSF

<400> 38
agcttcctgc tcaaggcctt agagcaagtg agg 33

<210> 39
<211> 33
<212> DNA
<213> Artificial Sequence

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cctcacttgc tctaagccct tgagcaggaa gct 33

<210> 40
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide for preparing [Asp17]hG-CSF

<400> 40
agcttcctgc tcaaggactt agagcaagtg agg 33

<210> 41
<211> 33
<212> DNA
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<223> Antisense of SEQ ID NO: 40

<400> 41

cctcacttgc tctaagtcct tgagcaggaa gct

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<210> 42
<211> 18
<212> PRT
<213> Escherichia coli

<220>
<221> SIGNAL
<222> (1)..(18)
<223> E. coli Gene III signal peptide

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Met Lys Lys Leu Leu Phe Ala Ile Pro Leu Val Val Pro Phe Tyr Ser
1 5 10 15

His Ser

<210> 43
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide containing Nco I restriction site

<400> 43
tatagccata gcaccatgga g

21

<210> 44
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID NO: 43

<400> 44
ctccatggtg ctatggctat a

21

<210> 45
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> The 2nd to the 10th amino acids of hG-CSF

<400> 45
Pro Leu Gly Pro Ala Ser Ser Leu
1 5

<210> 46
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
 <223> Oligonucleotide primer coding for the 2nd to the 10th amino acids of hG-CSF plus an additional cytosine at its 5'-end

<400> 46
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<210> 47
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense of SEQ ID NO: 46

<400> 47
 cagggagctg gcagggccca ggggg 25

<210> 48
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> E. coli Gene III signal peptide plus the 1st to the 5th amino acids of hG-CSF

<400> 48
 Phe Tyr Ser His Ser Thr Pro Leu Gly Pro
 1 5 10

<210> 49
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> The 1st to the 9th amino acids of [Met2,Val3]hG-CSF

<400> 49
 Thr Met Val Gly Pro Ala Ser Ser Leu
 1 5

<210> 50
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Oligonucleotide for preparing [Met2,Val3]hG-CSF

<400> 50
 tacgcgtcca tgggtgggccc tgccagctcc ctg 33

<210> 51

<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense of SEQ ID NO: 50

<400> 51
cagggagctg gcagggccca ccatggacgc gta

33

<210> 52
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> E. coli Gene III signal peptide plus the 1st to the 5th
amino acids of [Met2,Val3]hG-CSF

<400> 52
Phe Tyr Ser His Ser Thr Met Val Gly Pro
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<210> 53
<211> 23
<212> PRT
<213> Escherichia coli

<220>
<221> SIGNAL
<222> (1)..(23)
<223> Thermoresistant E. coli enterotoxin II signal peptide

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1 5 10 15

Ile Ala Thr Asn Ala Tyr Ala
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<210> 54
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> Modified thermoresistant E. coli enterotoxin II signal
peptide

<400> 54
Met Lys Lys Thr Ile Ala Phe Leu Leu Ala Ser Met Phe Val Phe Ser
1 5 10 15

Ile Ala Thr Asn Ala Gln Ala
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<210> 55

<211> 96
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Nucleotide sequence coding for the 1st to 32nd amino acids of [Ser1, Ser17]hG-CSF

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 <221> CDS
 <222> (1)..(96)

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 1 5 10 15
 tct tta gag caa gtg agg aag atc cag ggc gat ggc gca gcg ctc cag 96
 Ser Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
 20 25 30

<210> 56
 <211> 32
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> the 1st to 32nd amino acids of [Ser1, Ser17]hG-CSF

<400> 56
 Ser Pro Leu Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys
 1 5 10 15
 Ser Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
 20 25 30

<210> 57
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 <212> DNA
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<220>
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<220>
 <221> CDS
 <222> (1)..(96)

<400> 57
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 Ser Pro Leu Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys
 1 5 10 15
 tgc tta gag caa gtg agg aag atc cag ggc gat ggc gca gcg ctc cag 96
 Cys Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
 20 25 30

<210> 58
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> the 1st to the 32nd amino acids of [Ser1]hG-CSF

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Ser Pro Leu Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys
1 5 10 15
Cys Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
20 25 30

<210> 59
<211> 96
<212> DNA
<213> Artificial Sequence

<220>
<223> Nucleotide sequence coding for the 1st to the 32nd amino acids
of [Ser17]hG-CSF

<220>
<221> CDS
<222> (1)..(96)

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aca ccc ctg ggc cct gcc agc tcc ctg ccc cag agc ttc ctg ctc aag 48
Thr Pro Leu Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys
1 5 10 15
tct tta gag caa gtg agg aag atc cag ggc gat ggc gca gcg ctc cag 96
Ser Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
20 25 30

<210> 60
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
<223> the 1st to the 32nd amino acids of [Ser17]hG-CSF

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Thr Pro Leu Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys
1 5 10 15
Ser Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
20 25 30

<210> 61
<211> 96
<212> DNA
<213> Artificial Sequence

<220>

<223> Nucleotide sequence coding for the 1st to the 32nd amino acids of [Thr17]hG--CSF

<220>

<221> CDS

<222> (1)..(96)

<400> 61

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Thr	Pro	Leu	Gly	Pro	Ala	Ser	Ser	Leu	Pro	Gln	Ser	Phe	Leu	Leu	Lys	
1				5					10					15		

acc	tta	gag	caa	gtg	agg	aag	atc	cag	ggc	gat	ggc	gca	gcg	ctc	cag	96
Thr	Leu	Glu	Gln	Val	Arg	Lys	Ile	Gln	Gly	Asp	Gly	Ala	Ala	Leu	Gln	
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<210> 62

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<212> PRT

<213> Artificial Sequence

<220>

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<400> 62

Thr	Pro	Leu	Gly	Pro	Ala	Ser	Ser	Leu	Pro	Gln	Ser	Phe	Leu	Leu	Lys
1				5					10					15	

Thr	Leu	Glu	Gln	Val	Arg	Lys	Ile	Gln	Gly	Asp	Gly	Ala	Ala	Leu	Gln
			20					25					30		

<210> 63

<211> 96

<212> DNA

<213> Artificial Sequence

<220>

<223> Nucleotide sequence coding for the 1st to the 32nd amino acids of [Ala17]hG-CSF

<220>

<221> CDS

<222> (1)..(96)

<400> 63

aca	ccc	ctg	ggc	cct	gcc	agc	tcc	ctg	ccc	cag	agc	ttc	ctg	ctc	aag	48
Thr	Pro	Leu	Gly	Pro	Ala	Ser	Ser	Leu	Pro	Gln	Ser	Phe	Leu	Leu	Lys	
1				5					10					15		

gcc	tta	gag	caa	gtg	agg	aag	atc	cag	ggc	gat	ggc	gca	gcg	ctc	cag	96
Ala	Leu	Glu	Gln	Val	Arg	Lys	Ile	Gln	Gly	Asp	Gly	Ala	Ala	Leu	Gln	
			20					25					30			

<210> 64

<211> 32

<212> PRT

<213> Artificial Sequence

<220>

<223> the 1st to the 32nd amino acids of [Ala17]hG-CSF

<400> 64

Thr Pro Leu Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys
1 5 10 15

Ala Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
20 25 30

<210> 65

<211> 96

<212> DNA

<213> Artificial Sequence

<220>

<223> Nucleotide sequence coding for the 1st to the 32th amino acids of [Gly17]hG-CSF

<220>

<221> CDS

<222> (1)..(96)

<400> 65

aca ccc ctg ggc cct gcc agc tcc ctg ccc cag agc ttc ctg ctc aag 48
Thr Pro Leu Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys
1 5 10 15

ggc tta gag caa gtg agg aag atc cag ggc gat ggc gca gcg ctc cag 96
Gly Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
20 25 30

<210> 66

<211> 32

<212> PRT

<213> Artificial Sequence

<220>

<223> the 1st to the 32th amino acids of [Gly17]hG-CSF

<400> 66

Thr Pro Leu Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys
1 5 10 15

Gly Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
20 25 30

<210> 67

<211> 96

<212> DNA

<213> Artificial Sequence

<220>

<223> Nucleotide sequence coding for the 1st to the 32nd amino acids of [Met2, Val3]hG-CSF

<220>

<221> CDS

<222> (1)..(96)

<400> 67

aca atg gtc ggc cct gcc agc tcc ctg ccc cag agc ttc ctg ctc aag	48
Thr Met Val Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys	
1 5 10 15	

tgc tta gag caa gtg agg aag atc cag ggc gat ggc gca gcg ctc cag	96
Cys Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln	
20 25 30	

<210> 68

<211> 32

<212> PRT

<213> Artificial Sequence

<220>

<223> the 1st to the 32nd amino acids of [Met2, Val3]hG-CSF

<400> 68

Thr Met Val Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys	
1 5 10 15	

Cys Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln	
20 25 30	

<210> 69

<211> 96

<212> DNA

<213> Artificial Sequence

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<223> Nucleotide sequence coding for the 1st to the 32nd amino acids of [Met2, Val3, Ser17]hG-CSF

<220>

<221> CDS

<222> (1)..(96)

<400> 69

aca atg gtc ggc cct gcc agc tcc ctg ccc cag agc ttc ctg ctc aag	48
Thr Met Val Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys	
1 5 10 15	

tct tta gag caa gtg agg aag atc cag ggc gat ggc gca gcg ctc cag	96
Ser Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln	
20 25 30	

<210> 70

<211> 32

<212> PRT

<213> Artificial Sequence

<220>

<223> the 1st to the 32nd amino acids of [Met2, Val3, Ser17]hG-CSF

<400> 70

Thr Met Val Gly Pro Ala Ser Ser Leu Pro Gln Ser Phe Leu Leu Lys

1 5 10 15
Ser Leu Glu Gln Val Arg Lys Ile Gln Gly Asp Gly Ala Ala Leu Gln
20 25 30

<210> 71
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Modified Shine-Dalgarno sequence

<400> 71
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10